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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/780,606	02/19/2004	Jae-Hee Oh	9862-000026/US	3174
30593	7590	01/11/2005	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C.			NADAV, ORI	
P.O. BOX 8910			ART UNIT	
RESTON, VA 20195			PAPER NUMBER	
			2811	

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	Application No. 10/780,606	Applicant(s) OH ET AL	
	Examiner ori nadav	Art Unit 2811	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 November 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 3, 4 and 10-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 5-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election of group I (claims 1-10) in the reply filed on 11/01/2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Applicant's election with traverse of the embodiment of figure 4 in the reply filed on 11/01/2004 is acknowledged. The traversal is on the ground(s) that the difference between the two embodiments is sufficient to render the embodiments patentably distinct, but would not present any undue burden on the examiner if both species were examined simultaneously. This is not found persuasive because examination of two patentably distinct inventions present undue burden on the examiner.

The requirement is still deemed proper and is therefore made FINAL.

### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, a lower electrode height and a first metal thickness being substantially identical, as recited in claim 1, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended

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replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

The disclosure is objected to because of the following informalities: The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. Appropriate correction is required.

### ***Claim Objections***

Claim 1-2 and 5-9 are objected to because of the following informalities: The term "heght" should read "height". Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 2 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support in the disclosure and the drawings for a first insulating layer formed on the cell array region and the peripheral circuit region and having openings in which the lower electrode is formed, and a second insulating layer formed on the first insulating layer, as recited in claim 1, wherein a first conductive plug extending through the first insulating layer to connect the lower electrode to the semiconductor substrate, as recited in claim 2.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-2 and 5-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claimed limitations of a first insulating layer formed on the cell array region and the peripheral circuit region and having openings in which the lower electrode is

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formed, and a second insulating layer formed on the first insulating layer, as recited in claim 1, are unclear as to how the lower electrode can be formed in an opening in the first insulating layer, since the disclosure recites the lower electrode 126 being formed in the second insulating layer 120.

The claimed limitations of the lower electrode height and the first metal thickness are substantially identical, as recited in claim 1, are unclear as to in what respect the lower electrode height and the first metal thickness are identical. It is further unclear as to which element is the lower electrode height.

The claimed limitations of openings in which the lower electrode is formed, as recited in claim 1, are unclear as to how a lower electrode can be formed in plurality of openings.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 and 5-9, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al. (6,163,046).

Regarding claim 1, Okumura et al. teach in figures 35 and 38 and related text a semiconductor device comprising:

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a cell array region 3 formed in a semiconductor substrate and including a capacitor having a lower electrode, the lower electrode having a lower electrode height;

a peripheral circuit region 4 formed in the semiconductor substrate and including a first metal wiring, the first metal wiring having a first metal thickness;

a first insulating layer formed on the cell array region and the peripheral circuit region and having openings in which the lower electrode is formed; and

a second insulating layer formed on the first insulating layer, the first metal wiring being arranged in the second insulating layer,

wherein a lower surface of the lower electrode and a lower surface of the first metal wiring are in a substantially planar orientation.

Okumura et al. do not state that the lower electrode height and the first metal thickness are substantially identical.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the lower electrode height and the first metal thickness substantially identical in Okumura et al.'s device in order to improve the characteristics of the device by routine optimization and experimentation.

Regarding claims 2 and 5-9, Okumura et al. teach in figures 35 and 38 and related text a first conductive plug extending through the first insulating layer to connect the lower electrode to the semiconductor substrate; and

a second conductive plug extending through the first insulating layer to connect the first metal wiring to the semiconductor substrate.

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first gate structures formed in the cell array region, the first insulating layer being formed on the first gate structures;

second gate structures formed in the peripheral region, the first insulating layer being formed on the second gate structures;

a first storage node contact hole and a first bit line contact hole formed through the first insulating layer for exposing a first surface of the substrate in the cell array region;

first metal contact holes formed through the first insulating layer for exposing the first and second gate structures and a second surface of the substrate in the peripheral region;

conductive plugs formed in the first storage node contact hole, the first bit line contact hole and the first metal contact hole, the first metal wiring being in electrical contact with the conductive plug in the first metal contact hole;

a capacitor formed in the second insulating layer in the cell array region, the capacitor being in electrical contact with the conductive plug in the first storage node contact hole;

an insulating interlayer 20 formed on the capacitor, the first metal wiring and the second insulating layer; and

a second metal wiring 32 formed on the insulating interlayer in the peripheral region, the second metal wiring being electrically connected to the first metal wiring,

wherein the peripheral region includes at least one of core circuitry peripheral circuitry and logic circuitry,



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wherein the capacitor has a metal/insulator/metal structure, and

a bit line formed on the insulating interlayer and electrically connected to the conductive plug in the first bit line contact hole through a second bit line contact hole formed through the insulating interlayer, wherein the bit line and the second metal wiring are formed from a single metal layer,

wherein the insulating interlayer includes a first sub-layer formed on the first metal wiring and a second sub-layer formed on the capacitor, the first metal wiring and the first sub-layer.

**Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.**

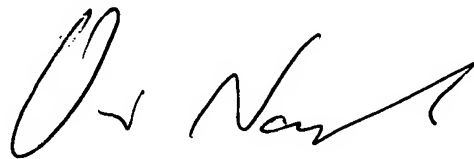
Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(571) 272-**

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**1660.** The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**

O.N.  
1/8/05

A handwritten signature in black ink, appearing to read 'Ori Nadav', with a stylized flourish at the end.

ORI NADAV  
PRIMARY EXAMINER  
TECHNOLOGY CENTER 2800